TIME AND MOTION IN WALTER BURLEY'S LATE *EXPOSITIO* ON ARISTOTLE'S *PHYSICS*

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The development of fourteenth-century scholastic philosophy of time has been studied relatively little.[1] While historians of philosophy have focused their attention rather on medieval theories of motion, they have paid much less attention to that important derivative of motion, time. A possible explanation for this may lie precisely in the derived status of time as secondary to motion.[2] Yet, is has long been known that developments in medieval philosophy of motion were not necessarily mirrored in the philosophy of time. A good example is John Buridan, who explained time in virtually the same way as William of Ockham, although he explicitly rejected the latter's philosophy of motion.[3]

In order to provide a sketch of the philosophy of time in the

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[1] Cf. J.M.M.H. Thijssen, "Late Medieval Natural Philosophy. Some Recent Trends in Scholarship," *Recherches de Philosophie et Théologie Médiévales* 67 (2000), 158–190. There are a few studies of selected topics in the philosophy of time, e.g. Cecilia Trifogli, "Il problema dello statuto ontologico del tempo nelle «Quaestiones super Physicam» di Thomas Wylton e di Giovanni di Jandun," *Documenti e studi sulla tradizione filosofica medievale* 1 (1990), 491–548; Marek Gensler, "The Concept of Time in a Commentary on the *Physics* Attributed to Antonius Andreae," *Tempus aevum aeternitas. La concettualizzazione del tempo nel pensiero tardomedievale*, eds. Guido Allincy and Luciano Cova (Florence, 2000), 163–186, in which the author discusses the philosophy of John the Canon rather than that of Antonius Andreae; and also the chapters about time in Marilyn McCord Adams, *William Ockham*, vol. II (Notre Dame, IN, 1987); Jürgen Sarnowsky, *Die aristotelisch-scholastische Theorie der Bewegung. Studien zum Kommentar Alberts von Sachsen zur Physik des Aristoteles* (Münster, 1989); Stefan Kirschner, *Nicolaus Oresmes Kommentar zur Physik des Aristoteles* (Stuttgart, 1997). For a survey of thirteenth-century philosophy of time, see e.g. Pasquale Porro, *Forme e modelli di durata nel pensiero tardomedievale: l'aevum, il tempo discreto, la categoria "quando"* (Leuven, 1996); and Cecilia Trifogli, *Oxford Physics in the Thirteenth Century (ca. 1250–1270). Motion, Infinity, Place and Time* (Leiden, 2000).

[2] Aristotle, *Physics* 4, 11, 219a2–3, 9–10.

[3] John Buridan, *Quaestiones super VIII libros Physicorum Aristotelis*, qu. 3, 7 (ms. Copenhagen, Kongelige Bibliotek, Ny kgl. Saml. 1801 fol., ff. 72va–73vb). Cf. Dirk-Jan Dekker, "Buridan's Concept of Time. Time, Motion and the Soul in John Buridan's Questions on Aristotle's *Physics*," *The Metaphysics and Natural Philosophy of John Buridan*, eds. J.M.M.H. Thijssen and Jack Zupko (Leiden, 2001), 151–163.

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fourteenth century, it is necessary to identify first the positions of several philosophers and theologians. In addition to the old, but still useful survey by Anneliese Maier,[4] there exist more recent investigations into the concept of time of Thomas Wylton, John of Jandun and John the Canon.[5] In this article, it is my purpose to present aspects of Walter Burley's philosophy of time. Burley's position is interesting, because it is situated in a lively debate with William of Ockham, on the one hand, and with Gregory of Rimini, on the other.[6] Also, in his explanation of time, Burley was one the days' most faithful followers of Averroes.

In the course of his career, Burley commented on Aristotle's *Physics* three times.[7] The earliest commentary, an *expositio*, which also contained some *quaestiones*, dates back to before 1316. This early literal commentary was followed by a *quaestiones* commentary, written between 1316 and 1322. The questions have only survived in two incomplete manuscripts. Finally, Burley expanded and rewrote his early *expositio* into a final commentary, also including *quaestiones*, which he finished in two stages, beginning in 1324. Of the three commentaries, it was the late *expositio* which circulated most widely and which exerted the greatest influence on contemporary debates in natural philosophy. For these reasons, I shall rely on the late *expositio* in this article.[8]

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In scholastic philosophy of time, a standard repertoire of questions about several fixed topics gradually developed. The standard topics were (not necessarily in this order) the reality of time, the

[4] Anneliese Maier, *Metaphysische Hintergründe der spätscholastischen Naturphilosophie* (Rome, 1955), 45–137.

[5] See above, note 1.

[6] Cf. Jennifer Ottman and Rega Wood, "Walter of Burley: His Life and Works," *Vivarium* 37 (1999), 1–23.

[7] About Burley's *Physics* commentaries, see Rega Wood, "Walter Burley's *Physics* Commentaries," *Franciscan Studies* 44 (1984), 275–303; and Edith Sylla, "Walter Burley's Practice as a Commentator on Aristotle's *Physics*," *Medioevo* 27 (2002), forthcoming.

[8] Neither of the manuscripts of the early *expositio* was available to me when writing this article. The one surviving fragment of a *quaestio* about time, "An tempus sit quantitas continua" (Basel, UB, cod. F V 12, ff. 169v–171v) deals with time as a number and with the way in which time must be understood as a discrete measure. In this fragment I found no doctrinal differences with the late *expositio*. Cf. also the contribution of Edith Sylla in the present fascicle of *Early Science and Medicine*, who compares the different versions of Burley's *Physics* commentary.

ontological status of time especially with regard to motion, the unity or unicity of time, and the relation between time and the intellective soul.[9]

In the first chapter of his *tractatus de tempore*—as *Physics* 4, 10–14 came to be called in medieval commentaries—Aristotle had given a number of arguments for the non-existence of time. He did not explicitly show how to solve the so-called paradoxes he had offered there. Scholastic philosophers would usually try to explain the reality of time on the basis of the reality of the instant ('now') connecting past and future, or on the basis of a special, weak, manner of being, which they would attribute to past and future.[10]

Aristotle had remarked explicitly that time is not identical with motion, but not without motion either. Yet, the manifest resemblance of time and motion, which the Stagirite himself had also noticed, occasioned a scholastic debate about the identity of time and motion. The question 'utrum tempus sit motus' recurs in practically every *quaestiones* commentary.[11] The discussion departed from the successive character of both motion and time. Already Aristotle had argued[12] that 'before and after' in time is to be regarded as parallel to the prior and posterior phases of motion. Also, the connection between the successive parts of both was very similar: the instant connecting past and future in time matches the so-called *mutatum esse*, which connects the prior and posterior phases of motion.

Yet, the outright identification of time with motion had explicitly been denied by Aristotle in the paradoxes at the beginning of his treatise about time. Particularly the rebuttal of the Platonic identification of time with the motion of the outer sphere of heaven were regarded as strong arguments against equating time and motion.

But the problem of the ontological status did not only concern the relation between time and motion. The relation between time and the intellective soul was closely tied to it. From Aristotle's re-

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[9] In theological contexts, other aspects of time were also discussed, cf. the reflections about the temporal measure applicable to angels, that usually occur in book II of *Sentences* commentaries.

[10] Trifogli, *Oxford Physics in the Thirteenth Century*, 207.

[11] Apart from the commentaries and commentators mentioned above, cf. also Albert Zimmermann, *Verzeichnis ungedruckter Kommentare zur Metaphysik und Physik des Aristoteles aus der Zeit von etwa 1250–1350*, vol. 1 (Leiden, 1971), 146–301.

[12] Aristotle, *Physics* 4, 11, 219a10–30.

mark that time cannot exist if there is no intellective soul it seemed to follow that time was in some way (or at least in part) an *ens rationis* without extramental existence.[13] This needed to be brought into harmony with the earlier statement that time is not motion, yet something of motion.

To explain the relation between time and motion, scholastic philosophers usually started with Averroes' interpretation. The Commentator had argued that time exists both in extramental reality and in the intellective soul: *partim in re, partim in anima.* The material part of time, which Averroes identified with motion, exists without an act of the intellect. The formal part, number, exists only when a soul is actually counting a motion. Although this solution was widely supported by scholasticism, it was vulnerable to fundamental criticism.[14] Critics argued that by positing beings, which existed potentially outside of the soul but came into being in the intellective soul, Averroes was introducing quite unusual entities into the Aristotelian ontological framework, which does not seem to have any place for such mixed entities and which does not contain any other examples. Furthermore, criticics argued that Averroes could not explain sufficiently how the intellect was to affect an extramental entity.

The relation between time and motion led to further questions. If time is not motion, but *aliquid motus* ('something of motion'), is it then an accident? And if so, there seems to be no reason why time should be an accident of one motion rather than of another. In other words, there seem to be as many times as motions, which is an inconvenient conclusion.[15] Aristotle would probably have solved the difficulty by using the identity of simultaneous instants.[16] If two motions begin simultaneously, then both begin at the numerically identical instant t_1, not in two really distinct instants. If they also end simultaneously, both end again at the same instant, t_2. From this Aristotle would conclude that, if t_1 and t_2 are both numerically one, then the interval t_1–t_2 is also numerically one, which guarantees the unicity of time.[17]

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[13] Aristotle, *Physics* 4, 14, 223a25–26.

[14] Cf. Henry of Ghent, *Quodlibet III,* Udo Reinhold Jeck, *Aristoteles contra Augustinum. Zur Frage nach dem Verhältnis von Zeit und Seele bei den antiken Aristoteleskommentatoren, im arabischen Aristotelismus und im 13. Jahrhundert* (Amsterdam, 1994), 459–476.

[15] Cf. Trifogli, *Oxford Physics in the Thirteenth Century,* 238–240.

[16] Aristotle, *Physics* 4, 14, 223b1–4.

[17] For Aristotle the identity of simultaneous instants is possible, because he

In the thirteenth and fourteenth centuries, Averroes' solution was usually preferred to the solution just described. Averroes held that, properly speaking, there is but one subject of time, viz. the motion of the outer sphere of heaven. This motion is privileged above all others, because it alone allows for the perception of any motion as motion. It causes an awareness of being *in esse moto*, which is the necessary presupposition for distinguishing between the prior and the posterior parts of any given motion. Only of this first motion, time can properly be said to be an accident. Of all other motions, time is a measure, which does however not inhere in them:[18]

> And if we also stated that time is understood in the definition of any motion, then it follows that time is multiplied according to the multiplication of motions, like the disposition in whiteness and other accidents, which are multiplied according to the multiplication of their subject. But if we stated that its disposition with one motion is the disposition of something that follows, in the definition of which is understood what it follows upon; and that its disposition with other motions is as the disposition of number with what it counts, then the difficulty will be solved. (...) Therefore, time follows upon this motion [=the motion of the outer sphere of heaven, DJD], and this motion is understood in its definition. And it does not measure this motion as a number measures what is numbered, but as something measuring a real form. But it measures other motions as a number measures what is numbered, viz. because what is counted is not understood in the definition of number.

We shall now turn to Walter Burley's treatment of these matters as discussed in his late *expositio* on the *Physics*.

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According to Maier's analysis, Burley represents an 'extremely realistic' point of view. She contrasts this to William of Ockham's

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assumes the existence of the unending motion of the outer sphere of heaven, against which all inferior motions can be measured.

[18] Averroes, *In Physicam* (ed. Venice, 1562; reprinted Frankfurt am Main, 1962) IV, t.c. 132, fol. 203vaI–203vbL: "Et, si posuerimus etiam quod tempus accipitur in definitione cuiuslibet motus, sequitur ut multiplicetur per multiplicationem motuum, sicut est dispositio in albedine et aliis accidentibus quae multiplicantur per multiplicationem subiecti. Si autem posuerimus quod dispositio eius cum motu uno est dispositio sequentis, in cuius definitione accipitur illud, ad quod sequitur, et cum aliis motibus sicut dispositio numeri cum numerato, dissolvetur questio. (...) Tempus igitur sequitur hunc motum, et iste motus accipitur in definitione eius, et ipsum mensurat illum, non secundum quod numerus mensurat numeratum, sed secundum quod mensurat aliquid quod est forma in re. Alios vero motus mensurat secundum quod numerus mensurat numeratum, scilicet quod numeratum non accipitur in definitione numeri."

standpoint, which she calls 'extremely subjectivistic.'[19] Both qualifications are based upon the ontological status that the two authors attribute to time. According to Maier, Burley's philosophy of time is based on the conviction that time relates to motion as a quantity to a substance. Time is an independent formal moment of motion and exists as a real being without an act of the intellective soul being required. For Ockham, on the other hand, time does not really exist (*realiter*), but the term 'time' connotes the motion of the first sphere of heaven, and co-signifies an act of the intellective soul (*consignificat*).

Maier then continues by arguing that Burley begins by showing that time and motion are not identical.[20] He quotes the six possible ways of explaining the essence of time, listed by Avicenna, only to prove that one of them is wrong, namely the view that time is really motion. Maier senses that the view dismissed by Burley is in fact Ockham's, which makes her conclude that Burley's arguments against Avicenna have in fact been directed against Ockham.

Finally, Maier notices that Burley's 'extreme realism' is particularly troublesome with regard to the unicity of time.[21] His assumption that time was a real accident of motion did not really allow him, according to Maier, to avoid the unwanted conclusion of '*tot tempora quot motus*.' She therefore suspects Burley of trying an easy escape, when he states that there may in fact be as many times as there are motions, but that in truth only one of them constitutes the *tempus primum*, which guarantees the unicity of time.

In the course of this article, I shall try to make clear that this summary of Burley's philosophy of time does not fully do justice to his standpoint, and, secondly, that Burley's realism is not as 'extreme' as Maier presented it.

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Burley's point of departure is that time is a successive quantity. At different places in his commentary, he argues that time has parts that do not coincide with each other, and that it is therefore a quantity; the argument being that all that has essentially and by itself parts that do not coincide, is a quantity.[22] Next, time cannot

[19] Maier, *Metaphysische Hintergründe*, 86–87.
[20] *Ibid.*, 87.
[21] *Ibid.*, 130–131.
[22] Walter Burley, *In Physicam Aristotelis expositio et quaestiones* (Venice, 1501; reprinted Hildesheim, 1972), hereafter quoted as "Burley" with fol. nr.), fol. 131ra:

be the quantity of permanent beings, because permanent beings, as far as their size is concerned, are not distinguished by time, but rather by their extension. Time is rather the measure of successive beings, i.e., of motions.[23]

A second basic conviction in Burley's philosophy of time is that successive beings exist outside the soul as far as their natural being is concerned (*quantum ad esse naturale*), but that they can exist as wholes only by a completive act of the soul.[24] The successive parts of these beings can only exist simultaneously in the soul. In other words, the soul can conceive motion and time as wholes, even though they cannot exist in their entirety extramentally. The question of how time relates to the soul will be discussed below.

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Is time motion? Burley begins by quoting Averroes' familiar distinction between the consideration of motion as a *forma diminuta*, on the one hand, and motion as *passio*, on the other hand.[25] According to the first consideration, which in Averroes' eyes constitutes the *modus verior* as described in Aristotle's *Physics*,[26] motion belongs to the same category as the form that is ultimately to be reached and differs only gradually from this ultimate form. According to the second consideration, the *modus famosior*, described in Aristotle's *Categories*,[27] motion is instead the way that is traversed towards the ultimate form and therefore belongs in the category of 'passion' (*passio*).

Burley argues that neither consideration allows for an identifi-

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"Patet manifeste quod illa res quae est tempus est essentialiter et per se quantitas. Et hoc potest sic patere. Illud quod primo et ex se habet partem extra partem, per se est quantitas; sed tempus est huiusmodi; ergo tempus est quantitas primo et per se. Maior patet primo *huius* (...). Minor vero etiam patet, quia tempus habet primo et per se partem priorem et posteriorem."

[23] Burley, fol. 131vb.

[24] Burley, fol. 123va: "Et intelligo quod tempus et motus non habent esse completum in actu quantum ad omnes suas partes nisi per animam. Unde tempus et motus non habent esse totum simul nisi in consideratione animae. Motus tamen [non] habet esse sibi debitum, scilicet in successione et in fluxu praeter animam, nec in aliquo dependet ab anima quantum ad suum <esse> naturale, sed solum dependet ab anima quantum ad suum esse actu actualitate simultatis et quantum ad esse suarum partium. Unde praeteritum et futurum non sunt nisi in consideratione animae. Anima vero potest considerare motum totum simul, quamvis motus non possit existere totus simul."

[25] Cf. Averroes, *In Physicam* III, t.c. 4, fol. 87raC–rbE.

[26] Aristotle, *Physics* 3, 1, 201a1–9.

[27] Aristotle, *Categories* 9, 11b1–7.

cation of time with motion. The most important reason for this is that time is a quantity, because of the fact that its parts exist outside of each other (*partes extra partes*). This renders the identification of time with motion in the category of passion impossible, because nothing in the category of passion can at the same time belong in the category of quantity.[28] Such an identification would also be impossible if motion and time were taken as *formae diminutae*. In this case, motion and time would belong to the same category *qua* the final form towards which they tend, i.e., to the category of quantity, of quality, or of place. But since time is to be considered a quantity, as we have already seen, it should obviously belong to the category of quantity. In this case, one would have to conclude that time is a quantitative motion, i.e., an increase or decrease. However, this conclusion is unacceptable, because motion, of which time is the quantity, neither increases or decreases quantitatively.[29]

The counterarguments against identifying time and motion also include an Aristotelian argument that was frequently invoked by scholastic philosophers, viz. that motion can be fast or slow, while time cannot—for nothing can be measured by itself.[30]

Burley thus believes to have shown that time is not motion if motion is understood in the two traditional ways—a conclusion which, he says, is contrary to the views of some (unnamed) *auctoritates*.[31] To solve the difficulty he introduces a third way of considering motion, which he justifies once more by appealing to

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[28] Burley, fol. 131ra: "Tempus est per se quantitas, ut patet ex praecedentibus, quia per se habet partem extra partem. Sed motus qui est de genere passionis non est per se quantitas. Ergo tempus non est motus qui est de genere passionis."

[29] Burley, fol. 131ra: "Si tempus esset motus qui est forma diminuta, sequitur quod tempus esset motus qui est ad quantitatem. Sed hoc est falsum, quia omnis motus qui est ad quantitatem est augmentatio vel diminutio. Ergo si tempus esset motus qui est forma diminuta, sequitur quod tempus esset augmentatio vel diminutio. Quod est absurdum, quia sic illud in quo esset tempus augeretur et diminueretur, quod est inconveniens."

[30] Aristotle, *Physics* 4, 10, 218b13–18. Burley, fol. 131rb: "Omnis motus de genere passionis vel de genere termini ad quem est velox vel tardus. Sed tempus non est velox vel tardum. Ergo. Minor patet, quia velox et tardum determinantur et mensurantur tempore; sed tempus non mensuratur nec determinatur tempore; ergo."

[31] Burley, fol. 131rb: "Sed tamen est intelligendum propter solutionem aliquarum auctoritatum quod motus potest accipi alio modo." Perhaps Burley intends Averroes here, who held that at least the material moment of time is identical to motion.

Aristotle and Averroes.[32] This solution, which looks somewhat awkward to us, proposes that we disregard both the *terminus ad quem* and the *via* of motion and that we consider only the successive and the quantitative moments, which both time and motion have in common. If we regarded motion merely as a successive quantity, then time would really be motion. Time is nothing but a *duratio transmutationis successivae*, a duration of successive change.[33] Given that motion, if considered as a successive quantity, is neither fast nor slow by itself and will therefore rather measure other fast or slow motions than being itself subject to measurement, the Aristotelian objection that was valid against the first two views will not hold against this third view.[34] In short, then, this factual redefinition of motion allows for an identification of time with motion. Burley thinks that another advantage of this third view lies in the fact that motion, as a successive quantity, is identical with time insofar as both are divisible into only one dimension, viz. duration. According to the other two views, motion differs from time as it is divisible according to three dimensions.[35]

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Burley continues his investigation of the relation between time and motion by asking whether time 'follows'[36] motion, i.e., whether there is always a motion preceding time.[37] The answer to this question is important for the determination of the types of motion of which time can be the measure. It will also influence his explanation of the unicity of time: is time an accident of all motions (*tot tempora quot motus*) or is it not?

First, Burley distinguishes between two significations of the term 'time.' There is time *without* distinction between before and after,

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[32] Aristotle, *Metaphysics* 5, 13, 1020a7–32 and Averroes *ad loc.*

[33] Burley, fol. 131rb: "Tertio vero modo accipitur motus pro quantitate successiva quae est de genere quantitatis, (...) accipiendo motum sic est concedendum quod tempus est motus, quia tempus non est aliud quam quantitas successiva vel duratio transmutationis successivae."

[34] Burley, fol. 131rb: "motus tertio modo acceptus nec est velox nec tardus, sed est mensura velocis et tardi."

[35] Burley, fol. 131rb: "motus tertio modo acceptus non dividitur ad divisionem mobilis, sed solum dividitur secundum longitudinem durationis, quoniam motus tertio modo acceptus non dividitur in partes simul existentes, sed solum dividitur in partes succedentes, scilicet in partem praeteritam et in partem futuram."

[36] The notion of 'following' plays a central role in Aristotle's explanation of the relation between space, motion and time, cf. *Physics* 4, 11, 219a10ff.

[37] Burley, fol. 131va: "utrum tempus sit consequens motum."

and there is time *with* such a distinction. Duration without such a distinction is usually known as *aeternitas* (according to Burley, it is called so by the theologians). But there are also grammatical reasons why it is called 'time':[38]

> otherwise the following proposition would be simply false: 'God existed before the creation of the world', because according to grammarians the term 'before' cosignifies time. For, if time can only be understood as a duration with before and after, then the following proposition would be simply false: 'God existed before the creation of the world.' But this is not true, because according to faith and the truth it is certain that God existed before the creation of the world. And this time or *saeculum*, i.e., that which is the measure of the first cause, a duration existing wholly simultaneously, is what the theologians call 'eternity.'

When we speak about time without before and after, then it is clear that time does not follow motion, because this duration existed before creation, when there was not yet any motion.

But normally, we use the expression 'time' to designate a measure that implies a distinction between prior and posterior parts. This common usage can futher be divided into four sub-meanings of 'time.' Burley mentions them in ascending order of perfection. Least perfect, but most common (*communiter*) is the consideration of time as the duration of any motion, without regard of its kind of uniformity. The description of the duration of a local motion is, by contrast, a proper use (*proprie*), because local motion has three advantages over other kinds of motion: it is perceptible to the senses, is more manifest than other motions, and its uniformity is easy to perceive. Speaking even more properly (*magis proprie*), time is the duration of circular local motion around the center of the earth: such motion is identical for everyone regardless of his place on earth. But time in the most proper sense (*maxime proprie*) is the duration of the *primum mobile*.

This list of usages of the term 'time' may be compared with similar distinctions made by Ockham and Buridan,[39] who, just like

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[38] Burley, fol. 131va: "aliter ista esset falsa: 'Deus fuit ante creationem mundi', quia secundum grammaticos 'ante' consignificat tempus. Si igitur tempus non potest accipi nisi pro duratione habente prius et posterius, illa esset simpliciter falsa: 'Deus fuit ante creationem mundi.' Sed hoc est falsum, quia certum est secundum fidem et veritatem quod Deus fuit ante creationem mundi. Et sic relinquitur quod tempus potest accipi pro duratione carente priori et posteriori. Et illud tempus vel saeculum, scilicet quod est duratio primae causae, quae duratio est tota simul, vocant theologi 'aeternitatem.'"

[39] Cf. John Buridan, *Quaestiones super VIII libros Physicorum Aristotelis*, IV, 12 (ms. Copenhagen, Kongelige Bibliotek, Ny kgl. Saml. 1801 fol., ff. 111va–112va).

Burley, concede that many different motions are used as the yardsticks of time in the practice of everyday life, but who equally insist that the motion of the outer sphere of heaven represents 'time' in its most proper sense because of its uniformity.

If time is taken as a duration which includes a before and an after, then indeed it follows motion. The reason is ultimately that time is a successive being: before and after cannot exist simultaneously. This means that time cannot exist without the past passing away and the future coming to be. And since passing away and coming to be are impossible without motion, time cannot exist without motion either.[40]

But what motion is intended here? The distinction that Burley has just drawn between more and less proper senses of the term 'time' allows him to answer that time follows all motions, but most properly speaking, that it follows the motion of the outer sphere of heaven. The first part of this conclusion is problematic insofar as it leads immediately to the question of the unicity of time. However, the conclusion as a whole shows that Burley is following Averroes very closely at this point.

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But contrary to Maier's suggestion, Burley is not avoiding the task of facing the resulting difficulties concerning the unicity of time.[41] Regarding the question of whether time follows motion, he confirms that time in the most proper sense, also called *tempus primum*, follows the motion of the outer sphere of heaven, the *primus motus*. All other times are measures of the inferior motions that they follow upon.

> I say (...) that the first time follows upon one motion. And also any time follows upon its motion as the motion of which it is the intrinsic measure. And I concede that time follows upon any motion and that time is multiplied according to the multiplication of motions. But time in the most proper sense is not multiplied according to the multiplication of motions.[42]

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[40] Burley, fol. 131vb: "Item, tempus non potest esse sine priori et posteriori, quae quidem prius et posterius non possunt esse simul. Ergo tempus non potest esse sine generatione et corruptione prioris et posterioris. Sed generatio et corruptio non sunt sine motu. Ergo accipiendo tempus pro duratione habente prius et posterius non potest esse tempus sine motu. Et ideo dico quod tempus quod est duratio ex se habens prius et posterius, est consequens motum."

[41] See above, note 21.

[42] Burley, fol. 132rb: "Ad rationes vero principales. Dico ad primam quod primum tempus consequitur unum motum. Et etiam quodlibet tempus conse-

One may wonder which difference between the first motion and inferior motions justifies this position. A difference in regularity or velocity is no sufficient explanation for the different ways in which time seems to relate to the different motions. Behind Burley's treatment of the first motion is Averroes' position, according to which the first motion plays a special role in the perception of any motion. According to Averroes, perception of motion is possible only if the perceiving subject is aware that it is 'in changed being' (*in esse moto*), which in turn is both caused and guaranteed by the first motion. Burley, who describes the awareness of change as perception 'in a confused way' (*confuse*), explains this as follows:[43]

> I say that when we perceive any motion whatsoever, we perceive the first motion in a confused way: when perceiving any motion whatsoever, we perceive that there is a single regular motion that is the measure of the motion we are perceiving. But whether this single regular motion is the motion of heaven, or another motion, this we do not perceive. And this is why we perceive in some way the first time when we perceive any motion whatsoever, and, in addition, when we perceive any motion whatsoever, we perceive the first motion in a confuse way. And thus, when perceiving any motion whatsoever, we also perceive the own time following upon that motion.

A possible objection against Burley's Averroistic explanation is that time 'most properly' would be multiplied in case there were more than one heaven. Burley concedes this unwanted conclusion, but weakens it immediately. It will only hold true if the term 'time' is taken for what it denotes, viz. the succession in the first motion. But if 'time' is understood for its *significatum*, then no such inconvenient multiplication will occur. For, indeed, the *significatum* of 'time' is according to Burley[44]

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quitur suum motum ut motum cuius est mensura intrinseca. Et concedo quod omnem motum consequitur tempus, et quod tempus multiplicatur ad multiplicationem motuum. Sed tempus propriissime dictum non multiplicatur ad multiplicationem motuum."

[43] Burley, fol. 132rb: "Dico quod percipiendo quemcumque motum percipimus primum motum modo confuso, quia percipiendo quemcumque motum percipimus quod est aliquis simplex motus et uniformis qui est mensura motus quem percipimus. Sed utrum ille motus simplex et uniformis sit motus caeli vel alius motus, hoc non percipimus. Et ideo percipiendo quemcumque motum percipimus primum tempus aliquo modo. Et etiam percipiendo quemcumque motum percipimus primum motum modo confuso. Et sic percipiendo quemcumque motum percipimus etiam proprium tempus consequens illum motum."

[44] Burley, fol. 132va: "hoc nomen 'tempus' significat idem quod haec tota oratio: 'duratio motus divisi per intellectum in prius et posterius, ut in nunc et in tunc, ita quod materiale in significato huius nominis est duratio motus, et formale in eo est prius et posterius divisa vel apprehensa per intellectum.'"

> the duration of motion that is divided by the intellect into before and after—as in 'now' and 'then'—, in such a way that the material moment of this term is the duration of motion, and the formal moment is the before and after that is divided or understood by the intellect.

Should more than one motion of heaven exist, the material moment of time would indeed be multiplied, but not the formal moment, because before and after of one motion would be identical with before and after of every other simultaneous motion and would indeed not be multiplied according to the multiplication of motions.[45]

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Burley's reflections on the signification of the term 'time' organically proceed with an investigation of Aristotle's definition of time as 'the number of motion with regard to the before and after.'[46] Averroes understood this definition as a confirmation of his idea of a mixed ontological status of time: the 'number' in the definition refers to a mental form and the 'before and after' to an extramental material substrate. Burley does not explicitly comment upon the Commentator's position, but once more investigates the different attributes of time.

He starts from his earlier description of time as a duration with a before and an after. Given that an infinite duration cannot be a number of motion with regard to before and after (lacking determined ends, it cannot be used as a measure), the scope of Burley's description of the signification of time (just quoted) should be limited to finite durations. Also, it is necessary that before and after are actually counted by the intellective soul, because time is not merely the succession of motion, but quantifies this succession. Because time in the most proper sense is *tempus primum*, its description is to be understood with regard to the *motus primus*. The 'duration' mentioned by Burley is therefore most properly *duratio prima*. The 'number' of Aristotle's definition is explained by Burley as *numerus generis determinati*, i.e., not as an undetermined math-

[45] Burley, fol. 132va: "Unde, si essent plures motus primi, intellectus intelligeret unam durationem primi motus esse quando est alia duratio primi motus, et intelligeret unum primum motum esse quando est alius primus motus, et intelligeret quod tunc inciperent duae partes illorum primorum motuum, et tunc desinit utraque illarum partium. Et sic prius et posterius utriusque durationis determinata per nunc et tunc non essent diversificata secundum intellectum, posito quod essent plures mundi et plures primi motus."

[46] Aristotle, *Physics* 4, 11, 219b1–2 and 220a24–25.

ematical number, but rather as a determined measure. Just as a pint is a determined measure for liquids, time similarly is the determined measure for motions.[47]

It is remarkable that Burley considers the first motion of which, according to his own definition, time is the measure as a motion in the category of 'passion,'[48] although he had explicitly denied earlier that time is identical with motion in this very category.[49] This seeming inconsistency is perhaps the result of Burley's practice of reworking the older *expositio* commentary, but it can maybe also be solved in the following way. In his earlier discussion concerning the possible identification of time with motion, the question had been whether time itself belongs in the category of passion. This was denied on the grounds that time is a quantity and quantities do not belong in the category of passion. The conclusion had been that time could not be identical with motion *qua* passion. In the meantime, however, Burley has determined that only the reference of the term 'time' is identical with (prime) motion. The relevant aspect of motion has thus been established as lying exactly in its successive character. Of the two ways, already mentioned, of regarding motion, the most suitable is the one that puts most stress on succession, i.e., on the way to be traversed in order to reach the final form. It is this way that is presumably intended in Burley's definition of motion. Still, it is somewhat odd that Burley does here not simply refer to the third way of considering motion that he introduced earlier.

The paraphrase of Aristotle's definition that Burley finally reaches, is this:[50]

> the *first time*, i.e., the first duration of which the extremes are actually counted, *is the number*, i.e., the continuous measure, *of motion*, i.e., of any motion in the category of passion, *with regard to the before and after*, i.e., ac-

[47] Burley, fol. 133ra–b.

[48] Burley, fol. 133rb: "accipitur pro transmutatione successiva, scilicet pro transmutatione de genere passionis."

[49] See above, note 25.

[50] Burley, fol. 133rb–va: "dico quod motus in illa definitione accipitur pro transmutatione successiva, scilicet pro transmutatione de genere passionis; et prius et posterius accipiuntur in hac definitione pro priori et posteriori primi temporis naturalis; et motus accipitur indifferenter pro quolibet motu de genere passionis. Ex quibus patet quod intellectus definitionis est ille: primum tempus, id est prima duratio cuius extrema sunt actu numerata, est numerus, scilicet mensura continua, motus, hoc est cuiuslibet motus de genere passionis, secundum prius et posterius, hoc est secundum partes priores et posteriores primi temporis naturalis diversas apud intellectum in actu."

> cording to the prior and posterior parts of natural first time that the intellect in act divides.[51]

A difficulty with this paraphrase, which Burley needs to explain, is his explanation of number as a continuous measure. The problem is not really the traditional question that we often encounter in this context, viz. "how can a measure be both discrete (number) and continuous (motion)?"[52] It is rather the objection raised by Robert Grosseteste,[53] to the effect that a continuous measure needs itself another continuous measure before it can be used as a measure. As this second measure is continuous, too, this would lead to an infinite regression, so that eventually no continuous measure would be measurable.

In his solution, Burley states that time as a continuous measure is indeed infinitely divisible. There is no natural smallest unit by which time is measured. The use of time-units is therefore a human convention (*institutio hominum*). It is by human agreement that the continuous measure of a yard consists of a determined number of continuous measures called inches. A practical consequence of this may be imprecision, which can occur if the definition of the base measure is not clear enough. Such imprecision would be inconceivable if we used natural measures.[54]

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[51] Cf. Burley's description of time at fol. 134rb: "secundum quod tempus accipitur pro proprio tempore quod est mensura omnium motuum, describitur sic: 'Tempus est numerus motus secundum prius et posterius sicut partes temporales, et sunt in primo motu tamquam in subiecto.'"

[52] This question recurs in many *quaestiones* commentaries. Buridan for example notices it in *quaestio* 4, 13 of his *Physics* commentary (ms. Copenhagen, Kongelige Bibliotek, Ny kgl. Saml. 1801 fol., ff. 112va–113rb). He solves the problem by saying that terms do not always belong to the category of their *suppositum*. For example, the term '*pater*' supposits for a substance, but does not belong in the category 'substance.' Likewise, '*tempus*' supposits for a continuous motion, i.e., in the category 'quality,' but belongs itself in the category of (discrete) quantity because of the included distinction between earlier and later.

[53] Robert Grosseteste, *In Physica* 4 (ed. Richard C. Dales, *Roberti Grosseteste Episcopi Lincolniensis Commentarius in VIII libros Physicorum Aristotelis* (Boulder, 1963), 90–91).

[54] Burley, fol. 133vb: "quia continuum est divisibile in infinitum, ideo in continuis non est aliqua prima et una mensura secundum materiam, sed solum secundum institutionem hominum. (...) Dicendum est quod in continuis non est tanta certitudo sicut in discretis, quia prima mensura in discretis est indivisibilis secundum materiam, scilicet unitas, sed prima mensura in continuis non est indivisibilis secundum materiam sed secundum institutionem humanam. Circa quam institutionem potest esse error."

In the preceding paragraphs, it has been shown how Burley employs the activity of the intellective soul in his explanation of the reality of time. In extramental reality, the parts of a successive entity cannot exist simultaneously, but in the soul they can. Burley explains the reality of time as a whole by stating that those parts of time that exist no longer and those parts that do not yet exist, can be present to the soul together with the present instant or 'now' of which Burley does not deny the extramental reality.[55] The *actus completivus* lends time an existence that it does not have by itself.

There is a second context in which Burley appeals to the activity of the soul. According to Averroes, time exists *partim in re, partim in anima*. Burley agrees with this, because he too explains motion as the material moment of time (which is what the term 'time' denotes), and the number of that motion as the formal moment. Number cannot exist but through the activity of a counting soul.

The third context in which the relation between time and the soul comes under scrutiny is the discussion regarding Aristotle's remark that time cannot exist if no soul exists.[56] From his own definition of 'time' as 'a successive quantity with which the soul counts and measures,'[57] Burley concludes that time does not exist if no intellective soul exists. Indeed, the term 'time' signifies a composite (*significat copulatum*) of successive quantity, the intellective soul, and the act of measuring performed by the soul. In the actual measurement of a motion, therefore, motion and the intellective soul are connected with one another (*copulantur*), together with the quantity with which the soul measures and with its act of measuring. In accordance with Averroes, Burley considers the act of measuring by the soul as the formal moment of time.[58] Burley

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[55] Burley, fol. 124va: "Et quando dicitur quod esse temporis completur per animam et quod tempus non habet esse in actu nisi per animam, ut vult Commentator, dico quod Commentator intelligit quod tempus non habet esse in actu perfecto et completo nisi in consideratione animae, quoniam tempus non habet esse totum simul nisi in consideratione animae: quia anima potest intelligere totum tempus simul, cum tempus non existat in re totum simul. Et sic esse temporis completur per animam quo ad secundam completionem, quae est esse simul totum."

[56] Aristotle, *Physics* 4, 14, 223a25–26.

[57] Burley, fol. 147rb: "hoc nomen 'tempus' in actu significat idem quod haec tota oratio: 'quantitas successiva per quam anima numerat et mensurat motum.'"

[58] Burley, fol. 147rb: "Dico quod hoc nomen 'tempus' significat unum copulatum ex quantitate successiva et ex anima et ex actuali numeratione motus ab anima. Cum enim anima actu mensurat motum, copulantur ad invicem anima et motus et quantitas per quam anima mensurat motum, et actio animae. Et ita actio

silently passes over the ontological difficulties that result from the assumption of such an ontologically composite being and which were certainly discussed in the first half of the fourteenth century.

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In sum, then, it can be said that Burley was convinced that the term 'time' denotes an extramental, successive, entity, but signifies a being composed of the motion of the outer sphere of heaven, the intellective soul, the measure and the measuring act of the soul. His position clearly reflects Averroes' *partim-partim*. Following the Commentator, Burley considered time 'most properly' the quantified successive moment of the motion of the outer sphere of heaven. This motion differs from all other motions, because it alone causes the awareness of being *in esse moto* which is required to perceive motion as motion at all. Given that Burley considered time 'most properly' an accident of this first motion, he was able to save the unicity of time. By including the act of measuring in his paraphrase of Aristotle's definition, Burley suggested that time does not exist unless the intellective soul is actually counting.

Considering the important role that Burley assigned to the soul in the constitution of time, it makes little sense to characterize his position as 'extremely realist.'[59] Indeed, even in so-called 'extremely subjectivistic' theories such as Ockham's or Buridan's, time exists extramentally in the 'most proper' sense. For these authors, too, 'time' denotes the *primus motus*, while it connotes an act of the intellective soul. And for them, too, the first motion can only be used as a measure for other motions because of an act of the intellective soul.[60]

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forte est formale in significato temporis, sicut in significato huius orationis 'lapis visus a me' formale est ipsa visio quae copulat lapidem visui meo."

[59] On the theme of realism in some fourteenth-century discussions of time, see also Trifogli, "Il problema dello statuto," 504–510.

[60] In Walter Burley's late *exposition*, a large number of *conclusiones* is found in which the subject matter of the entire eight books of Aristotle's *Physics* is summarized. These conclusions also convey an impression of Burley's interpretation of the text. The *conclusiones* featuring in the commentary on the *tractatus de tempore* are the following (number, folio, *conclusio*):

42 (125rb) quod tempus non est completa revolutio caeli
43 (126rb) quod tempus non sit motus
44 (126vb) quod tempus non est sine motu
45 (127va) quod tempus est aliquid ipsius motus
46 (128rb) quod continuatio in tempore est a continuatione in motu

47 (128va) quod prius et posterius in tempore sunt a priori et posteriori in motu
48 (128vb) quod tempus consequitur motum ratione prioris et posterioris in motu
49 (129ra) <quod> tempus est numerus motus secundum prius et posterius
50 (129va) quod tempus est numerus motus
51 (129vb) quod tempus non est numerus quo numeramus
52 (136va) quod instans est idem secundum subiectum et diversum secundum esse sive secundum rationem
53 (137ra) quod autem mobile sit magis notum quam instans
54 (137rb) quod instans et tempus consequuntur se in esse ita quod si instans est etiam tempus est et e converso
55 (137va) quod instans continuat et dividit tempus
56 (138ra) quod instans sic se habet ad tempus quod non est pars temporis
57 (139rb) quod instans est accidens temporis
58 (138rb) quod instans secundum quod est terminus temporis est solius temporis
59 (138rb) quod instans secundum quod est numerus est aliorum a tempore
60 (139rb) quod tempus est continuum
61 (139va) quod in tempore invenitur minimum secundum multitudinem, non autem secundum magnitudinem
62 (139vb) quod tempus nec est velox nec tardum
63 (140vb) quod tempus mensurat motum et motus mensurat tempus
64 (141va) quod transmutabilia alia a motu sunt in tempore sicut numeratum in numero
65 (142rb) quod omne quod est in tempore exceditur a tempore
66 (142rb) quod omne quod est in tempore patitur a tempore passione corruptiva
67 (142rb) <quod> tempus est per se causa corruptionis eorum quae sunt in tempore
68 (142vb) quod res aeternae secundum quod sunt aeternae non sunt in tempore
69 (143ra) quod tempus est mensura quietis
70 (143rb) quod tam illud quod movetur quam illud quod quiescit mensuratur tempore
71 (143vb) quod omne quod non movetur nec quiescit non mensuratur tempore
72 (143vb) quod semper non ens non est in tempore
73 (144ra) quod quaecumque aliquando sunt et aliquando non sunt, sunt in tempore
74 (145ra) quod tempus est perpetuum
75 (145rb) quod idem nunc non est principium alicuius temporis et finis eiusdem
76 (145vb) quod tempus est magis causa corruptionis quam generationis
77 (146rb) quod omnis transmutatio per se est in tempore
78 (147rb) quod tempus in actu, hoc est illud quod hoc nomen 'tempus' significat, non potest esse sine anima
79 (147rb) quod illud ens quod est tempus potest esse sine anima
80 (147vb) quod tempus est numerus cuiuslibet motus
81 (148rb) quod primum tempus est
82 (148va) quod primum tempus mensuratur per motum circularem primum

SUMMARY

Walter Burley (1274/75–1344/45) is mostly known for his defense of realism against William of Ockham. The concept of time that he developed in his late literal commentary on Aristotle's *Physics* has even been labelled 'extremely realistic,' in contrast to William of Ockham's so-called 'extremely subjectivistic' alternative. However, as is shown in this article, when Burley's concept of time is viewed against the background of medieval theories of time, it appears that it is mainly a restatement and further elaboration of opinions held by Averroes. A detailed investigation of Burley's explanation of the reality, definition, and unicity of time, as well as of the relation between time and the intellective soul shows that his realism is certainly far less extreme than it has been believed.